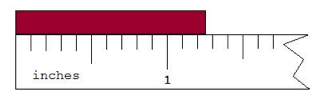
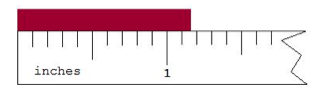
Particle Arrangement, Mass, Volume, and Density. Sig Figs, Metric and Dimensional Analysis

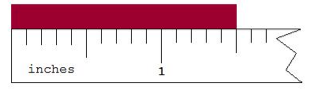
1. Measure the following substances with the correct number of sig figs. State the number of sig figs each number has.



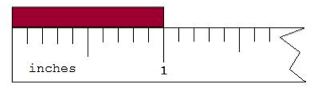
2.



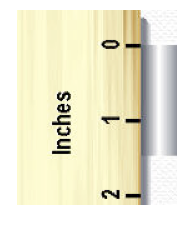
3.



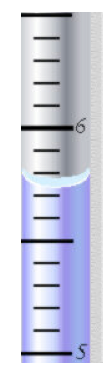
4.



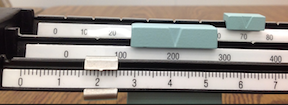
5.



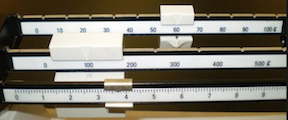
6.



7.



8.



Compare and contrast the following lab equipment and sig figs.

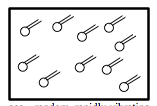
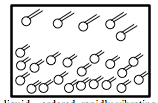
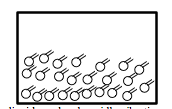
9. 10 ml vs 100 ml graduated cylinders

10. triple beam balance vs electronic balance

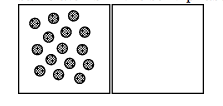
11. ruler measuring mm vs cm

12. Label which phase (or phases) of the substance is present in each of the three pictures.

Describe the arrangement and motion of the molecules during each picture.

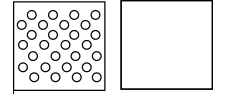


13. If the box at left contains atoms of aluminum in the liquid phase, represent the same atoms in the solid phase in the box at right.



14. How would you represent the atoms of aluminum in the gaseous phase?

15. If the box at left contains atoms of iron in steel wool, represent what the atomic structure of the steel wool after strong heating in the box at right.



16. Draw a picture of a substance that is a solid vs a liquid vs a gas. Compare and contrast these pictures.

17. Draw a picture of a substance that represents an element vs a compound vs a mixture. Compare and contrast these pictures.

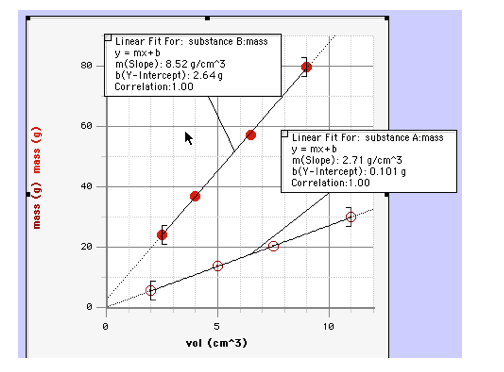
18. Draw a picture of two substances that have the same mass but substance A has a smaller volume than substance B. Compare and contrast these pictures.

19. Draw a picture of two substances that have the same volume but substance A has a smaller mass than substance B. Compare and contrast these pictures.

20. Does substance A or B have the higher density in problem #18? How do you know? Explain

21. Does substance A or B have the higher density in problem #19? How do you know? Explain

22. The 7th Hr class produced the graph below when they plotted mass vs volume for samples of two substances.



a. Write the equation of the line for substance B.

b. Is the y-intercept negligible? Why or why not?

c. How does substance B differ from substance A? Which is more dense?

d. Calculate the mass of a 8.0 cm3 piece of substance B. Do this two different ways. 1.Mark it on the graph and 2. Show math!

e. What would occupy a larger volume: 100 g of substance A or 100 g of  substance B? Explain. Show math!

f. Calculate the densities of substance A and B using two points and see how close you got to the values on the graph. Show math!!

Density

23. Find the mass of 250 cm3  of aluminum that has a density of 2.70 g/ml. Write the answer with the correct number of sig figs.

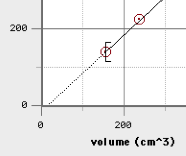
24. What is the volume of mercury, that has a density of 13.6 g/ml and a mass of 350 g? Write the answer with the correct number of sig figs.

25. Find the density of a substance whose mass is 250 g and a volume of 32 cm3 . Will this substance sink or float in water. Explain your reasoning. If this substance is copper, find the percent error when copper’s theoretical density is 8.70 g/ cm3 .

26. A block of copper has the following dimensions: 50 mm x 2.5 cm x 1.5 m. It also has a density of 8.70 g/ml. What is its mass in kg?

27. A beach ball has a mass of 30 grams and a diameter of 18 inches. What is its density in g/cm3 ?

Mass(g)



28. Using the provided graph on the smart board, pick 2 points and find the density of the substance. Does that substance sink or float? Explain your reasoning. Using the graph, what is the substance’s mass when its volume is 200 ml.

29. Round off to the indicated number of significant figures.

1. 808.57 to 4 sf's
2. 808.57 to 3 sf's
3. 808.57 to 2 sf's

d. 0.06372 to 3 sf's

e. 0.06372 to 2 sf's

30. Perform the following operations, expressing your answers to the proper number of significant figures. Write the calculator answer first, then the rounded answer.

Calculator Answer Answer Rounded to sf’s

1. 7.08 x 45.9

b. 4.82

1.732

c. 0.058

72.8

d. 1.327 + 2.22 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_

e. 95. 889 - 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

State how many significant digits each of the following numbers have:

a. 3.345 \_\_\_\_\_\_\_ b. 0.00205 \_\_\_\_\_\_\_\_ c. 809006 \_\_\_\_\_\_\_ d. 5000 \_\_\_\_\_\_\_\_\_\_

e. 0.01010 \_\_\_\_\_\_\_\_\_\_ f. 300.0 \_\_\_\_\_\_\_ g. 300. \_\_\_\_\_\_\_\_ h. 300 \_\_\_\_\_\_\_\_\_\_

Dimensional Analysis, Metric

1. 453.6 g = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cg

2. 2,300 mm = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ km

3. 1,000,000 sec = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_years

4. 4.8 ft = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm (Hint: 1 in = 2.54 cm)

5. 150 lbs = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ dg (Hint: 1 lb = 453.6 g)

6. 5.9 mm3  = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ dm3

7. 20 mi/hr = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm/s (Hint: 1 mi = 5280 ft,, 1 in = 2.54 cm)